REMARKS

This timely filed Reply is responsive to the Office Action mailed on April 14, 2005. Following restriction of claim 11-17, claims 1-10 were pending at the time of the Office Action. Claims 1-10 were all rejected.

In this Reply, claims 1, 6 and 10 have been amended, and claims 7-9 have been cancelled. Applicants have also withdrawn claims 11-17 herein and thus affirm their election of Group I, claims 1-10.

Paragraphs 25 and 54 of the specification have been amended to correct a mistake. The XRD pattern shown in Fig. 16 is from a ceramic, not from the preceramic polymer precursor as should be clear from the 1600 °C processing temperature disclosed. The XRD being from a ceramic, as well as the amorphous nature of the ceramic is also clear from paragraph 30 copied below:

[0030] The preceramic polymer or oligomer can optionally receive additional processing. The as-synthesized preceramic polymer or oligomer demonstrates significant compositional changes in the temperature range of from about 300 to 700°C during partial pyrolysis and remains an amorphous ceramic structure up to about 1600°C, as demonstrated by X-ray diffraction data disclosed herein. At or above a temperature of about 1600°C, a ceramic is formed when small generally hydrogen-rich species, such as CH_4 have been evolved.

Claim 6 was rejected under 35 USC 112, second paragraph based on the language "substantially amorphous". As amended, claim 6 now recites "wherein said ceramic is amorphous as evidenced by featureless XRD data". Support for the "featureless XRD data' can be found in paragraph 54 and Fig. 16 itself. The amendment to claim 6 thus overcomes the 35 U.S.C. 112 second paragraph, rejection.

Turning to rejections based on cited art, claims 1-4, 6, 9, and 10 were rejected under 35 U.S.C. § 102(b) as being anticipated by Bujalski et al. (U.S. 5,863,848). Claims 5, 7, and 8 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Bujalski et al. The Examiner asserts that:

Bujalski et al. teach methods of making silicon carbide fibers from borosilazanes. See for instance Example 3 in which a disilazane meeting claim 2, a halosilane meeting claim 3 and boron trichloride meeting claim 3 are reacted at 190°C to form a polymer. This meets the requirements of claims 1 to 3. This "exclusively by said reacting step" limitation in claim 4 is met by Bujalski et al. since the "reacting step" is open to adding the reactants at different times and carrying out the reaction at different temperatures.

For claim 6, the prior art is silent as to an amorphous property, through it does teach that the final ceramic is substantially crystalline. Note that it is unclear what weight to give the term "substantially amorphous". Similarly, for claim 5, the prior art is silent as to the chlorine content of the final polymer. The prior prepares a preceramic polymer or oligomer by the same process as claimed. Since the process by which the product is prepared will directly affect the properties of the polymer the resulting properties associated with the polymer or oligomer prepared by the claimed method must inherently be present in the prior art polymer or oligomer as well.

Before reviewing the cited art, Applicants will review the claimed invention now recited in amended claim 1. Amended claim 1 recites a method of forming SiBCN-based ceramics, comprising the steps of:

reacting a disilazane having the general formula $(R_3Si)_2NH$, where R is selected from the group consisting of vinyl, hydrogen, phenyl, and alkyls containing 1 to 3 carbon atoms with a boron halide including at least two halogens and a halosilane including at least two halogens at a

temperature of between 125 °C and 300 °C, wherein a SiBCN preceramic polymer or oligomer is formed, and

pyrolyzing said preceramic polymer or oligomer at a temperature that ranges from 700 °C to 1600 °C in a nonoxidizing atmosphere, said method being exclusive of a curing step before said pyrolyzing step in a halogen comprising environment, wherein said preceramic polymer or oligomer is converted into a ceramic. (additions shown underlined).

Support for the pyrolyzing step to form the ceramic can be found in claim 9 as filed, with the method being exclusive of a curing step before the pyrolyzing step in a halogen comprising environment being disclosed throughout the application, such as the heat cycle before pyrolysis in N_2 described in paragraph 68 in the Examples section.

Bujalski is entitled "Preparation of substantially crystalline silicon carbide fibers from borosilazanes" and discloses preparation of thermally stable, substantially polycrystalline silicon carbide ceramic fibers using borosilazane resins. The method comprises spinning fibers from the resin, infusibilizing (curing) the spun fibers and pyrolyzing the spun fibers at a temperature greater than about 1700 degrees C. Throughout Bujalski a curing step designed to impart infusibility is used before pyrolysis. For example, see col. 4, lines 19-23, col. 4, lines 36-42, col. 6 under "batch curing", as well as the Table 3 copied below:

C. Curing and Pyrolysis

I. Portions of the uncured fiber spun by the above technique were cured in a sealed chamber by exposure to HCl, BCl_3 or Cl_2 followed by exposure to ammonia. The cured fibers were then pyrolyzed in 2 steps—first to 1200° C. and then to 1800° C. The following table provides the results:

TABLE 3

Cure	From Tube*	Char Yield	Tensile Strength
1% HCl/NH_3	yes	47.6	99 ksi
1% HCl/NH_3	no	50.4	23 ksi
2% BCl_3/NH_3	yes	49.7	300 ksi
2% Cl_2/NH_3	yes	22.3	—

*Heated to 200° C. at 0.75° C./min under argon

In contrast, as noted above, Applicants' claimed process provides ceramics from SiBCN preceramic polymers or oligomers, without the need for a halogen comprising curing step to impart infusibility. The ability to impart infusibility and avoid Bujalski's halogen comprising curing step simplifies the resulting process to form the SiBCN-based ceramics and testifies to the differences in the processes (e.g. reagent ratios) and the resulting preceramic polymer or oligomer compositions according to the invention as compared to the processes and preceramic polymer or oligomer compositions according to Bujalski. Since Applicants' claimed method now recited in claim 1 is exclusive of Bujalski's halogen comprising curing step, Applicants submit that amended claim 1 is a patentable claim.

Several dependent claims are believed to recite independently patentable limitations. For example, amended claim 6 recites the ceramic is amorphous as evidenced by featureless XRD data. Bujalski's ceramic is disclosed to be substantially polycrystalline. (See col. 2, lines 46-54, col. 5, lines 1-4, as well as claim 5 which all disclose at least about 75% crystallinity). Other dependent claims, such as claim 5 which recites "wherein a chlorine content of said preceramic polymer or oligomer is less than 100 parts per million" are believed to be clearly patentable over Bujalski. However, in view of the patentability of amended claim 1, this issue is rendered moot.

Applicants have made every effort to present claims which distinguish over the cited art, and it is believed that all claims are now in condition for allowance. However, Applicants request that the Examiner call the undersigned (direct line 561-671-3662) if anything further is required by the Examiner prior to issuance of a Notice of Allowance for all claims. Although no fee is believed to be due, the Commissioner for Patents is hereby authorized to charge any

deficiency in fees due or credit an excess in fees with the filing of the papers submitted herein during prosecution of this application to Deposit Account No. 50-0951.

Respectfully submitted,

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